Licensable Technologies

Genie Pro

Applications:

- Generating map overlays from satellite image data
- Mapping damage caused by natural and man-made disasters
- Identifying and mapping crop distributions
- Detecting and mapping lines of communication (roads, railroads, rivers, canals, etc.)
- Locating buildings and vehicles in imagery
- Detecting disease in medical images
- Mapping surface features in images of other planets
- Mapping environmental changes
- Mapping human impact on terrain/land use

Benefits:

- Results can be reused to help Genie Pro build up its "understanding" of complex tasks
- Genie Pro learns to ignore unimportant image-to-image variations
- Compatible with other image analysis systems

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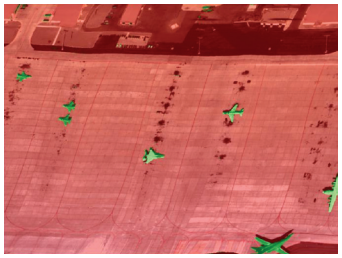
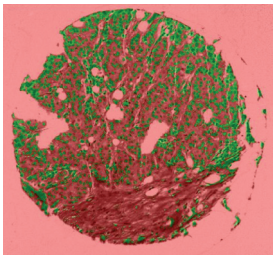


Detecting aircraft on a runway



Detecting cancerous cells in microscope imagery

Identifying and mapping rice fields (in red)

Summary:

Los Alamos National Laboratory's Genie Pro is a general purpose, interactive, adaptive tool for automatically labeling regions and finding objects in image data. Originally developed for analyzing multispectral satellite data, Genie Pro works with panchromatic (grayscale) and hyperspectral satellite data, aerial imagery, standard color (RGB) imagery and various types of medical imagery. It has been applied to a variety of tasks including crop and terrain mapping; road, railroad, and river (and other lines of communications) network mapping; broad-area search for vehicles and buildings; and cancer identification in histological images. Genie Pro is an interactive tool that works with the analyst to obtain highly accurate output. The system learns from the user, who has many tools available for manually optimizing results. Genie Pro's output takes the form of map overlays that can be exported in a variety of raster or vector formats for ingestion by other software packages. Genie Pro works with a large number of commonly used image formats (e.g., NITF, GeoTIFF, ERDAS HFA, etc.) and runs on both Windows and Linux systems.

Genie Pro represents a significant technical advance beyond the simple image classification algorithms found in popular GIS packages. Genie Pro is able to distinguish between similar features that share similar spectral characteristics (e.g., asphalt roads vs. asphalt roofs) by considering the spatial context of each pixel, which enables it to produce accurate map overlays on tasks that would defeat traditional classification algorithms.

In 2002, the original application, GENIE (GENetic Imagery Exploitation), received an R&D 100 Award as one of the year's top 100 most promising new technologies. Genie Pro, the latest upgrade, received the highest score in a recent government-sponsored evaluation of the software compared with three other commercially available packages designed to perform a similar task in an operational mapping environment. Genie Pro produced quality map overlays in less time than any of its competitors.

Development Stage:

An early beta release of Genie Pro is currently available for evaluation. The first production release will be available in early summer 2005.

Intellectual Property Status: Copyright Protected

Licensing Status: Available for non-exclusive licensing.

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